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748, and that of Legendre's formula is 6543. The accuracy of Riemann's formula at this point is extraordinary, the error being less than $\frac{1}{60,000}$ of the actual number of primes.

The introduction to the sixth million, which contains many important and interesting results besides those briefly summarized in this review, concludes with a discussion of the mode of calculating the values of li x and of Riemann's formula.

A mathematical table of this magnitude and importance may well be reckoned one of the "long results of time;" and England may be justly proud that such a work has not only been completed by one of her own mathematicians, but furnished with so worthy a crown.

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EXERCISES.

1

A HORIZONTAL WIND blows against a hemispherical dome of radius R^f. The pressure exerted by the wind on a plane surface normal to its direction is P pounds to the square foot; on a surface oblique to its direction the pressure exerted is normal, but is reduced in the ratio (Poncelet, *Mécanique Industrielle*, 403)

$$1 : 1 + \tfrac{1}{2}\tan^2 i,$$

where i is the angle of incidence. It is required to find the magnitudes and points of application of the horizontal and vertical components of the resultant wind-pressure. [*W. M. Thornton.*]

2

THREE closely connected tanks, T_1, T_2, T_3, contain Q_1 gallons of water, Q_2 gallons of vinegar, Q_3 gallons of brandy, respectively. A flow is set up from T_1 through T_2 to T_3 and back to T_1 at the rate of 1 gallon per second. The liquids are assumed to mix instantaneously, and the lengths of the connecting pipes are neglected. Show how to calculate the amount of water in each tank at the end of T seconds. [*De Volson Wood.*]

3

To find the radius of a sphere, which being let fall into a given conical wine-glass, full of water, will displace the maximum or minimum quantity of water. [*Benjamin Alvord.*]

4

ON one of the bounding radii of a given quadrant, radius r, a semicircle is drawn, radius $\frac{1}{2}r$, the semicircle being within the quadrant. Find the average area of the circle touching the other bounding radius of the quadrant and the arc of the semicircle. [*Artemas Martin.*]

5

Three lines are drawn from a point within a square to three corners of the square. Find a side of the square. [*J. M. Greenwood.*]

6

Find the value of the definite integral

$$\int_{\frac{1}{2}\pi}^{\pi} (1 - \tfrac{1}{2}\cos^2\vartheta + \sin\vartheta \sin 2\vartheta)^{\frac{1}{2}}.$$

[*L. G. Barbour.*]

PUBLICATIONS RECEIVED.

[In an early number a review will be given of the latest works on Algebra. Ed.]

A Practical Arithmetic. By G. A. Wentworth and Thomas Hill. Boston: Ginn, Heath, & Co.

Elements of Algebra. By G. A. Wentworth. Boston: Ginn, Heath, & Co.

Elements of Plane and Solid Geometry. By G. A. Wentworth. Boston: Ginn, Heath, & Co.

Plane and Spherical Trigonometry. By G. A. Wentworth. Boston: Ginn, Heath, & Co.

Surveying and Navigation. By G. A. Wentworth. Boston: Ginn, Heath, & Co.

A Complete Algebra. By A. Schuyler. Cincinnati: Van Antwerp, Bragg, & Co.

Elements of Geometry. By A. Schuyler. Cincinnati: Van Antwerp, Bragg, & Co.

Five-place Logarithmic and Trigonometric Tables. Arranged by G. A. Wentworth and G. A. Hill. Boston: Ginn, Heath, & Co.

A Practical Arithmetic. By Edward Olney. New York: Sheldon & Co.

The Complete Algebra. By Edward Olney. New York: Sheldon & Co.

Elementary Geometry. New Edition. By Edward Olney. New York: Sheldon & Co.

University Algebra. By Webster Wells. Boston: Leach, Shewell, & Sanborn.

Elements of Surveying and Leveling. By Charles Davies. Revised by J. Howard Van Amringe. New York: A. S. Barnes & Co.

The Theory of Turbines. Abstract. By Robert H. Thurston. (Journal of the Franklin Institute.)

Alignment Curves on any Surface, with special Application to the Ellipsoid. Abstract. By C. H. Kummell. (Philosophical Society of Washington. Mathematical Section.)

The Theory of Errors Practically Tested by Target-Shooting. Abstract. By C. H. Kummell. (Philosophical Society of Washington. Mathematical Section.)

Ballistics. By James M. Ingalls. (Course of Artillery.) Fort Monroe: United States Artillery School.

On Certain Possible Abbreviations in the Computation of the Long-Period Inequalities of the Moon's Motion due to the Direct Action of the Planets. By G. W. Hill. (American Journal of Mathematics.)

Compound Determinants. By C. A. Van Velzer. (American Journal of Mathematics.)